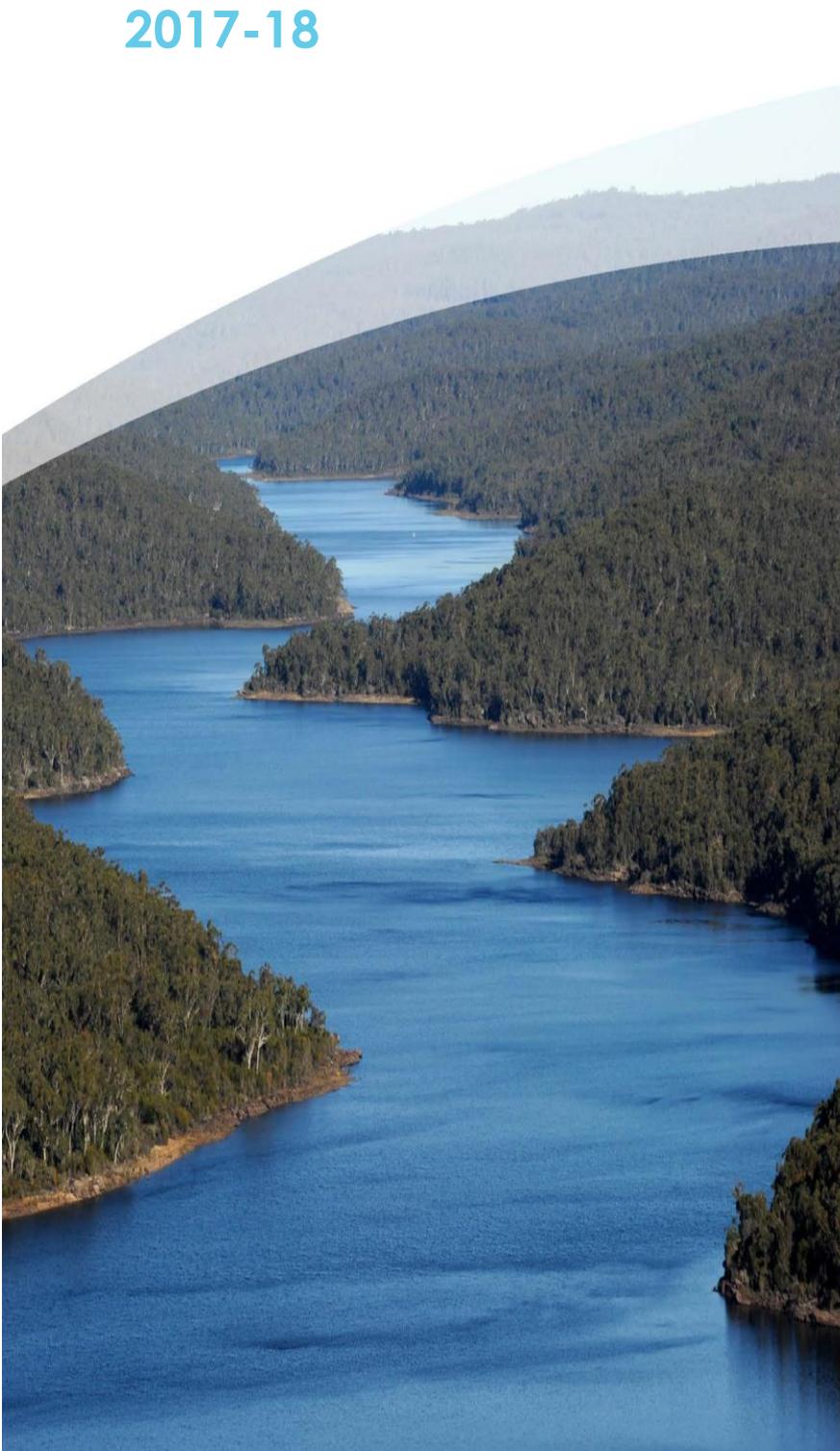


# Annual Catchment Management Report

2017-18



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## Introduction

WaterNSW protects the health of the Sydney Catchment Area to ensure reliable, quality drinking water is available for the 5 million people of Sydney and the Illawarra, Blue Mountains, Southern Highlands, Goulburn, and Shoalhaven regions.

Source water improvement and protection is governed and directed by our responsibilities under the Water NSW Act (s. 6(1)(c), 7(1)(g), (h) and (j), and 47(2)), State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011, the Australian Drinking Water Quality Guidelines 2011, and requirements of NSW Health. A principal objective under the WaterNSW Act is to ensure that the Sydney Catchment Area is managed and protected in a way that promotes water quality, the protection of public health and public safety, and the protection of the environment.

Each year WaterNSW reports on the work and activities in the catchment area. Under its licence to the Independent Pricing and Regulatory Tribunal (IPART), WaterNSW has specific annual reporting requirements for its catchment management activities. This report fulfils the requirements detailed in the IPART reporting manual.

The Sydney Catchment Area covers almost 16,000 square kilometres. More than one-third is important agricultural land for grazing, crops, and horticulture, and just under one-third is national park and bushland. The area is home to 120,000 people living in 15 local government areas.

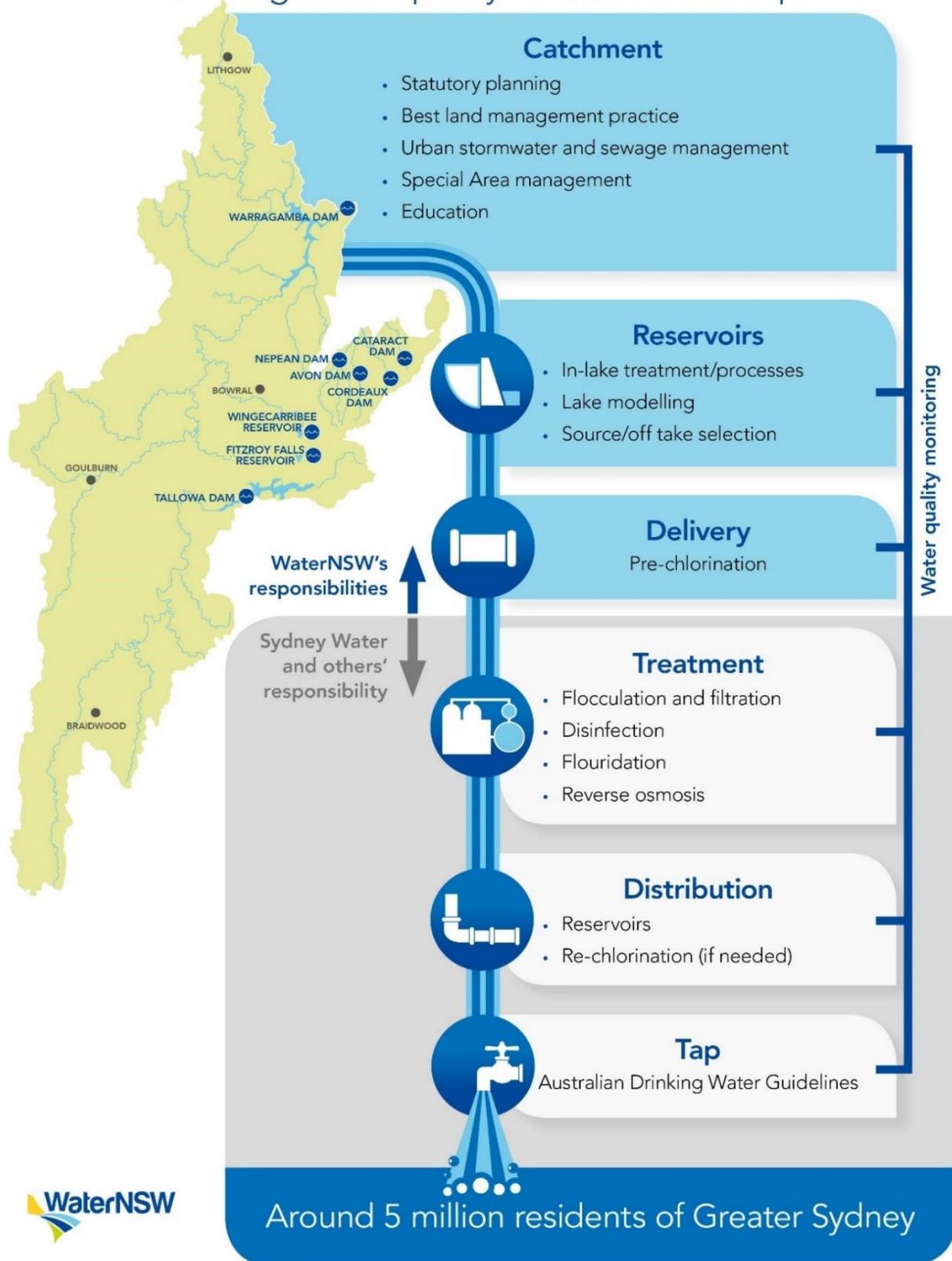
WaterNSW works with a wide range of catchment stakeholders in response to water quality risks in the Sydney Catchment Area and uses different tools and approaches to manage those risks.

The six areas of focused risk management for WaterNSW are:

1. Source Water Protection
2. Land Management
3. Water Quality Science
4. Enforcement and Surveillance
5. Development Impact Assessment
6. Engaged Communities.

This report outlines the achievements against the planned WaterNSW catchment work program for 2017-18 and progress against recommendations of previous Catchment or Operating Licence audits.

## Multi-barrier approach to protect Greater Sydney drinking water quality: Catchment to tap



# 1. Source Water Protection

Landscape degradation, poor farming and, intensive animal practices, wildfire, and past urban development all increase the risk of polluted runoff into waterways and drinking water supply reservoirs of the Sydney Catchment Area. Pathogens (Cryptosporidium and Giardia), suspended solids, phosphorus, and nitrogen are high priority pollutants.

Source water protection is governed and directed by responsibilities under the Water NSW Act, SEPP 2011, the Australian Drinking Water Quality Guidelines, and requirements of NSW Health. A principal objective is to manage and protect the Sydney Catchment Area in a way that promotes water quality, the protection of public health, and the protection of the environment.

WaterNSW works and partners with stakeholders including Local Land Services, the Australian River Restoration Centre, local government, industry groups, and landholders to expand the use of best farming practices, change long term behaviours, protect valuable landscape conditions, and reduce polluted runoff.

## 1.1 Grazing and Erosion Program

Poorly managed grazing practice combined with gully erosion is the largest source of pollutants from the Sydney Catchment Area. The Grazing and Erosion Program reduces current pathogen, nutrient, and sediment risks at the source.

WaterNSW works with partners and graziers to implement best management practices in the 4 critical areas of: stock access to waterways, gully and streambank erosion, sustainable grazing, and protection of riparian vegetation diversity.

Planned activities	Actual activities
<ul style="list-style-type: none"> <li>Collaborate with South East Local Land Services and Rivers of Carbon to award 65 or more (SELLS 45 + ROC 20) grants to landholders to protect riparian areas.</li> <li>Engage and facilitate landholders via an integration of mediums including web, print media, field days, workshops, and events around grazing management, waterway protection</li> </ul>	<ul style="list-style-type: none"> <li>40 project agreements were established with landholders in priority areas and grants awarded.</li> <li>6 training courses including Prograze, Farm Water Workshop, seasonal farm updates, and phosphorus management were run for over 120 participating landholders.</li> </ul>

<p>and sustainable grazing treat erosion, and improve grazing management.</p>	<ul style="list-style-type: none"> <li>• The film 'Buffers, sponges, and moderators' was created and launched, as well as a film promoting erosion control plus supporting social media, and web content.</li> <li>• An existing publication called 'Stock and Waterways' was re-written with a focus on NSW tablelands landscapes and up-to-date riparian management practices</li> </ul>
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<b>Planned outcomes</b>	<b>Actual outcomes</b>
<ul style="list-style-type: none"> <li>• Increased application of best management practices in the Sydney Catchment Area: length of riparian protection on high risk properties, erosion treated, hectares of grazing land improved with best practices.</li> <li>• Increasing interest and engagement from landholders in new management practices, and financial incentive programs.</li> </ul>	<ul style="list-style-type: none"> <li>• 70.3 km of riparian length protected, grazing practice on 619 ha improved, 21 head cuts in gullies treated (11 between 1-3 m deep).</li> <li>• Over 200 people have attended events, training courses and film launches.</li> <li>• A film on managing swampy meadows and wetlands in grazed landscapes has attracted over 2,100 views</li> </ul>

## 1.2 Urban Stormwater Program

After heavy rainfall, pollutants can wash from industrial and urban areas, Sewage Treatment Plants can overflow, and septic tanks overfill. The pollutants of most concern are phosphorus and nitrogen (from animal excreta and industrial, business, and residential waste), protozoan pathogens (in overflows of untreated sewage and malfunctioning on-site sewerage systems), and sediment (erosion of natural waterways from high velocity runoff).

In partnership with local government and service providers WaterNSW is working to identify point sources of storm water pollution in high risk areas, support and encourage councils to integrate water sensitive design into policy, and co-fund the implementation of water sensitive projects in target areas.

Planned activities	Actual activities
<ul style="list-style-type: none"> <li>Establish collaborative partnerships between priority councils, WaterNSW and service providers, and develop action plans to improve management of urban stormwater.</li> <li>Manage the completion of projects started in 2013 under the Infrastructure Grants for sewage and stormwater program.</li> </ul>	<ul style="list-style-type: none"> <li>Extensive consultation with priority councils and the CRC for Liveable Cities. Agreements with the CRC and councils have been negotiated.</li> <li>On-ground works on the Upper Jamison Creek stormwater project are complete. The Lower Jamison Creek Stormwater Project will be completed by December 2018.</li> </ul>

Planned outcomes	Actual outcomes
<ul style="list-style-type: none"> <li>Councils in priority areas have committed to improving stormwater management and begun to incorporate water sensitive design into policy and development planning and control.</li> <li>Reduced pollutant loads (kg) entering waterways.</li> </ul>	<ul style="list-style-type: none"> <li>The Blue Mountains City Council has developed a draft water sensitive cities transition strategy. WaterNSW is working with BMCC to engage and inform the community about the strategy and what it means in practice (public consultation period).</li> <li>Water quality monitoring to quantify pollution reduction is ongoing.</li> </ul>

### 1.3 Dairy Assistance Program

The waste from 18 dairy operations (156,000 L/day) in the Sydney Catchment Area is the equivalent to the wastewater generated from up to 160,000 people each day. Dairy farmers have undertaken considerable work over many years to introduce new practices for managing effluent, managing stock access to waterways, and controlling nutrient inputs into pastures.

WaterNSW has commenced a new partnership with DairyNSW, South Coast and Highlands Dairy Industry Group, dairy farmers, and SE Local Land Services. The new partnership will review current dairy operating systems and stock management practices and support dairy farmers to better manage important sources of water quality risk.

Planned activities	Actual activities
<ul style="list-style-type: none"> <li>Identify and map all infrastructure on willing dairy properties, and undertake water quality risk assessments (Stage 1).</li> <li>Actively network with Industry bodies and dairy farmers to invest in farm improvements and management practices (Stage 2).</li> </ul>	<ul style="list-style-type: none"> <li>Tender for mapping and risk assessments has been let.</li> <li>A workshop was organised to introduce the program and objectives to dairy farmers and extend an invitation to participate in site assessments.</li> <li>Initial consultation has established there are 18 active dairies in the Sydney Catchment Area and 12 farmers have agreed to participate in site assessments.</li> </ul>

Planned outcomes	Actual outcomes
<ul style="list-style-type: none"> <li>WaterNSW Board approved business case.</li> <li>Program Stage 1: engage dairy industry and farmers, collaborative partnerships between WaterNSW, South East Local Land Services, DPI Agriculture and DairyNSW have been established.</li> </ul>	<ul style="list-style-type: none"> <li>Dairy Program business case was approved by the WaterNSW Board.</li> <li>A steering group has been established comprised of members from Dairy NSW, South East Local Land Services, WaterNSW, and South Coast and Southern Highlands Dairy Industry Group.</li> </ul>

### Variations

- Specialist contractors were unavailable for stage 1 dairy assessments within the initial timeframe, resulting in unspent budget in 2017-18.
- Initial program payments to South East Local Land Services were brought forward to 2016-17, reducing expenditure for 2017-18.
- Stormwater projects ran ahead of schedule, with final grant payments expensed in 2016 17.

## 2. Land Management

WaterNSW has responsibilities as a land owner and manager within the Sydney Catchment Area. Land management activities include erosion control, derelict mine management, pest and weed detection and eradication, heritage site management, unauthorised access control, and fire regime planning and management.

The Special Areas around Sydney's water supply reservoirs function as important buffers and their management requirements are diverse and demanding. The Special Areas are protected catchment lands of mostly unspoilt native bushland and cover 365,000 hectares around the drinking water supply storages for Sydney, the Illawarra, Blue Mountains, Southern Highlands and Shoalhaven regions. WaterNSW and the NSW National Parks and Wildlife Service (NPWS) jointly manage the Special Areas, which are declared under the Water NSW Act 2014.

WaterNSW maintains public recreation areas at major dams and reservoirs and along the Shoalhaven River. The facilities attract more than 500,000 visitors each year. In the Braidwood area WaterNSW also owns and manages over 22,000 hectares, with nearly 50% of the land leased or licensed to private landholders and managed under agreement.

WaterNSW works alongside many partners to accomplish its objectives including the National Parks and Wildlife Service (NPWS), the Rural Fire Service (RFS), Local Land Services (LLS), the Department of Primary Industries (DPI), local councils, and neighbouring landowners.

### 2.1 Fire Management

Hazard reduction burns, asset protection zones, trained and fitness assessed staff, fire appliances, fire towers, and participation on district bushfire committees are all important activities for managing WaterNSW land, assets, and water quality risks.

Planned activities	Actual activities
<p>Minimise fire risks to life and property by:</p> <ul style="list-style-type: none"> <li>Mulching trees and woodland along fire trails to maintain fire breaks (40 km or more).</li> <li>Collaborate with NPWS and RFS to conduct hazard reduction burns (80 ha or more in priority blocks)</li> </ul>	<ul style="list-style-type: none"> <li>Roadside vegetation maintenance along access roads to Woronora and Tallowa Dams to improve road visibility, increase safety for recreational users, and improve their suitability as fire breaks.</li> </ul>

<ul style="list-style-type: none"> <li>• Slashing grass and vegetation for fire breaks in priority areas (400 ha or more)</li> <li>• Maintain early detection and rapid response capability and preparedness</li> </ul>	<ul style="list-style-type: none"> <li>• Slashing for fire breaks by NPWS (Sheepwalk Drive, Scott's Main Range (2.2 ha), and road verge vegetation management in Blackheath (5 km).</li> <li>• 5 large Hazard Reduction Burns totalling 12,813 ha by NPWS (Mt Solitary vicinity 3475 ha, Katoomba Catchment 50 ha, Evans Road Lookout 113 ha, Kowmung Mountain and Big Plain 4500 ha, Dinner Creek 175 ha, Surveyors Crag 4500 ha).</li> <li>• 8 Hazard Reduction Burns totalling 328 ha by WaterNSW (CA3, WT12, B4, B8, Sunset Mountain, W15, 9J, Helensburgh).</li> <li>• 205 km / 409 ha of slashing and a further 30 km of forest mulching / reach mowing along priority fire roads</li> <li>• Two fire towers managed by WaterNSW for early fire detection for 78 days.</li> </ul>
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Planned outcomes	Actual outcomes
<ul style="list-style-type: none"> <li>• Special Areas and WaterNSW land is managed to minimise the risks to water quality and ecological integrity.</li> </ul>	<ul style="list-style-type: none"> <li>• WaterNSW and the NPWS take an ongoing collaborative risk management approach in the Special Areas with an annual program focused on priorities including pests and weeds, assets and infrastructure, access, fire, ecology, cultural heritage, mining, and development.</li> </ul>

## 2.2 Remote Area Fire Management

Wildfire in the Special Areas can leave soils exposed to erosion, and reservoirs exposed to sediment, and burnt organic and mineral material. Every 10-15 years major fires have been experienced in the bushland areas surrounding reservoirs in the Sydney Catchment Area.

Fire risk is increasing under a changing climate, and rapid-fire response is a critical management tool to reduce the likelihood of catastrophic impacts from fires spreading.

Planned activities	Actual activities
<ul style="list-style-type: none"> <li>Maintain early detection and rapid response capability and preparedness including the Catchment Remote Area Fire Team program for 2017-18 fire season.</li> <li>Respond and attend outbreaks (target of 80%) during the declared bushfire danger period within condition specific guidelines and containing the fires to within 10 hectares.</li> </ul>	<ul style="list-style-type: none"> <li>Catchment Remote Area Fire Team (CRAFT) contracted for the 2017-18 fire season.</li> <li>CRAFT responded to 22 fires (91% of fires attended within 30 minutes, and 94% contained under 10 ha meeting agreed performance indicators).</li> </ul>

Planned outcomes	Actual outcomes
<ul style="list-style-type: none"> <li>Protection of people and assets, and prevention of water quality impacts.</li> </ul>	<ul style="list-style-type: none"> <li>No reports of injuries to people, or incidences of reduced water quality from fire within the Special Areas during the fire season. Only one recorded incidence of damage to a boundary fence. No other recorded damage to essential assets.</li> </ul>

## 2.3 Unsealed Roads Program

Throughout the Special Areas and WaterNSW freehold land is a network of unsealed roads and trails. This network is an important asset for safe access to utilities, to an array of infrastructure and sites such as monitoring stations, for research, and fire response and management.

Upgrades, repairs, and maintenance of the network is aligned with construction guidelines and achieves standards required under the Rural Fires Act 1997, helps prevent erosion, and meets the safe operational needs of all users.

Planned activities	Actual activities
<ul style="list-style-type: none"> <li>Maintain unsealed roads in Special and Controlled Areas to required standards (10 km or more).</li> </ul>	<ul style="list-style-type: none"> <li>253 km of fire trails were inspected and assessed.</li> <li>33 km of fire trail repaired and improved to meet standards (15A culvert repairs, sinkhole rectification on Fire Road 6, causeway repair on 7D and 6G, grading and capping on 7D).</li> <li>4 culverts replaced, and rock armouring undertaken along W7 series trail and Kedumba Valley Road by NPWS.</li> <li>Drainage works completed along W4 fire trail south (Wanganderry Pass 4 km, Bonnum Pic to Wanganderry Pass 8 km, O'Brians fire trail 4 km).</li> <li>Over 90 km of fire trail graded and rolled (Kedumba Pass, Fire Road 4 14.2 km, Blackheath Catchment 5 km, Sheepwalk Drive, Scott's Main Range and Yerranderie 55 km, W4 Fire Trail south – Wanganderry Pass 4 km, Bonnum Pic to Wanganderry Pass 8 km and O'Brians Fire Trail 4 km).</li> </ul>

Planned outcomes	Actual outcomes
<ul style="list-style-type: none"> <li>Unsealed roads are maintained for their intended purpose, and erosion and sediment loss are minimised.</li> </ul>	<ul style="list-style-type: none"> <li>Unsealed roads are open and trafficable for their intended use.</li> </ul>

## 2.4 Pests and Weeds Program

As a land owner and manager WaterNSW has responsibilities to respond to pests and weeds. WaterNSW works with the Office of Environment and Heritage, local government, Local Land Services, Regional Pest and Weed Committees, and landholders to control priority pests and weeds with best practices.

Planned activities	Actual activities
<p>Ongoing control of priority pests and weeds:</p> <ul style="list-style-type: none"> <li>• Participate in the South East LLS Regional Pest management plan development.</li> <li>• Contribute to the implementation of the Greater Sydney and South East Local Land Service Regional Weed Plans.</li> <li>• Pig, rabbit, dog, deer and fox control in the Special Areas (350 hrs or more).</li> <li>• Ludwigia weed control at Prospect reservoir.</li> <li>• Willow and blackberry control in Wingecarribee Swamp (20 ha or more).</li> <li>• Serrated tussock and blackberry control on Braidwood lands.</li> </ul>	<ul style="list-style-type: none"> <li>• Participated in the development of regional weed plans with the South East and Greater Sydney Local Land Services pest committee.</li> <li>• Spring and Autumn wild dog baiting (under the Southern Highlands Wild Dog Management Plan).</li> <li>• 28 hrs of willow control on Warragamba foreshores.</li> <li>• 400 ha of treated Lantana, Tree of Heaven, and Willow along Commodores Foreshore and Junction Point.</li> <li>• 175 hrs of deer control work, removing over 220 deer in Cordeaux and Cataract Dam catchments.</li> <li>• 49 hrs of fox and wild dog control in Metropolitan Special Area (174 baits were taken).</li> <li>• 210 hrs of dog, fox, deer, and goat control at Brallier in the Warragamba Special Area.</li> </ul>

	<ul style="list-style-type: none"> <li>• 250 pigs trapped and destroyed along the Cox's River, Kowmung River, and Murrin Creek by NPWS.</li> <li>• 70 hrs of aerial culls covering Blue Mountains NP, Kanangra Boyd NP, Yerranderie SCA and Nattai NP (pigs, goat, cat, fox, deer, and cattle control).</li> <li>• Over 40 ha of weed control on Wingecarribee Swamp and 6 days of Ludwigia control on Prospect Reservoir.</li> <li>• Over 20 ha of willow and blackberry control have been completed in Wingecarribee Swamp.</li> <li>• 21 days controlling blackberry, serrated tussock, and broom on WaterNSW Braidwood land.</li> </ul>
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<b>Planned outcomes</b>	<b>Actual outcomes</b>
<ul style="list-style-type: none"> <li>• Reduced abundance and extent of priority pests and weeds, minimising risks to water quality and ecological integrity.</li> </ul>	<ul style="list-style-type: none"> <li>• Focused annual programs that bring together neighbouring landowners and partners continually suppress important weed and pest species.</li> </ul>

## 2.5 Recreations Areas Management

Every year over 500,000 people visit recreation areas at dams, reservoirs, and rivers in the Sydney and Shoalhaven regions. Services are free of charge and are highly valued by the community.

WaterNSW has a social responsibility to provide a safe, clean, and welcoming environment for visitors to enjoy the dams, camping areas, and surrounds.

Planned activities	Actual activities
<ul style="list-style-type: none"> <li>• Progressive rebranding of signage at picnic and recreations areas and installation of improved compliance signage.</li> <li>• Improvements to Bendeela facilities and maintenance of remote toilets in Kangaroo Valley.</li> <li>• Routinely inspect trees in recreation and picnic areas and carry out works to keep them safe.</li> <li>• Routinely inspect and maintain safety and security barriers and fences around picnic areas.</li> <li>• Manage rock fall within the picnic areas and carry out works to maintain safety.</li> </ul>	<ul style="list-style-type: none"> <li>• Rebranding of signage progressing with Bendeela information signs replaced with new signs.</li> <li>• Portable toilets installed at Stuarts Crossing.</li> <li>• 5,600 litres of effluent removed from remote toilet in Kangaroo Valley (NPWS, WaterNSW).</li> <li>• 3,600 litres of effluent removed from remote toilets at Ruined Castle.</li> <li>• 203 trees assessed, monitored, and treated for tree health and public safety.</li> <li>• Safety fence installed at Bendeela to restrict embankment access following privet removal.</li> <li>• Trip hazards removed from cracked or raised concrete on footpaths, line marking improved, and stairs repaired at Woronora Dam.</li> <li>• Traffic management plan for Warragamba precinct improved and developed.</li> </ul>

Planned outcomes	Actual outcomes
<ul style="list-style-type: none"> <li>• Maintain recreational facilities for individuals and families that are safe, educational, and appropriate to their setting.</li> </ul>	<ul style="list-style-type: none"> <li>• Safety hazards were identified and managed on all public facilities.</li> </ul>

## 2.6 Barriers and Fencing Activities

Barriers, fences, and gates are required for a variety of reasons: to provide a safe space and protect the public and WaterNSW staff, the environment, items of cultural or heritage significance, and WaterNSW assets, and deter unlawful intrusion into restricted or controlled areas.

WaterNSW engages with neighbours, stakeholders, and the wider community to minimise social impacts arise from the installation of fences and infrastructure.

Planned activities	Actual activities
<ul style="list-style-type: none"> <li>Repair barriers and fences that are damaged or vandalised.</li> <li>Install and replace fences on priority boundaries in the Special Areas and Braidwood lands.</li> </ul>	<ul style="list-style-type: none"> <li>10.3 km of boundary fencing (repairs and renewal) in collaboration with neighbours.</li> <li>8 gates repaired or replaced for catchment security.</li> </ul>

Planned outcomes	Actual outcomes
<ul style="list-style-type: none"> <li>Deter unauthorised access to Special and Controlled Areas and activities inconsistent with water quality protection and the Protection of the Environment Operations Act.</li> </ul>	<ul style="list-style-type: none"> <li>Repairs and replacement of gates and fences around WaterNSW assets and strategically important access points.</li> </ul>

## 2.7 Cultural Heritage

There are many natural, historic, and indigenous heritage places throughout the Special Areas and broader Sydney Catchment Area. WaterNSW works with landholders, the community, local and state government, and indigenous land councils and representatives to identify, protect, and manage the values of heritage owned and operated by WaterNSW or found on WaterNSW land.

Planned activities	Actual activities
<ul style="list-style-type: none"> <li>Repair heritage stone works within heritage curtilage of dams and picnic areas.</li> </ul>	<ul style="list-style-type: none"> <li>Heritage stone wall repaired within Avon recreation area.</li> <li>Draft Wingecarribee Swamp Conservation Management Plan issued for stakeholder consultation.</li> </ul>

<ul style="list-style-type: none"> <li>• Liaise with Local Aboriginal Groups and elders on access and cultural heritage issues.</li> <li>• Protect aboriginal heritage sites.</li> </ul>	<ul style="list-style-type: none"> <li>• Liaison with the Gundungurra and Illawarra Local Aboriginal Land Councils about access to Special Areas, and grant funding.</li> <li>• Whale Cave Site, Appin heritage precinct, and Toms Hut Asset Protection Zones maintained.</li> <li>• Nyanga Mountain (Site #52-1-0001) Conservation Management Plan completed (NPWS).</li> <li>• Works to preserve Yerranderie heritage assets including the Courthouse, Police Station and St Helens Church. Works included repair of damaged floor boards and painting of external timbers.</li> </ul>
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<b>Planned outcomes</b>	<b>Actual outcomes</b>
<ul style="list-style-type: none"> <li>• Preservation of a diverse range of natural and cultural heritage values.</li> </ul>	<ul style="list-style-type: none"> <li>• Ongoing program to preserve cultural heritage values.</li> </ul>

## 2.8 Reserve Management

The National Parks and Wildlife Service and WaterNSW work together under the Special Areas Strategic Plan of Management to manage and protect the qualities of the Special Areas, particularly those that support water quality. Collaborative partnerships with local councils, indigenous land councils, landholders, government agencies, industry, and the community are important for management of the Special Areas.

Planned activities	Actual activities
<ul style="list-style-type: none"> <li>Monitor and ensure the effective delivery of the National Parks and Wildlife Service Land Management Plan and the joint implementation of the SASPoM.</li> </ul>	<ul style="list-style-type: none"> <li>Negotiated land management plan and agreement with NPWS.</li> <li>Jointly implemented the Special Areas Strategic Plan of Management.</li> <li>Annual works program included horse management, weed control on Lake Burragorang, road and trail maintenance, and rock art conversation at Nyanga Mountain, Tomat Creek, and Laceys Tableland.</li> </ul>

Planned outcomes	Actual outcomes
<ul style="list-style-type: none"> <li>Management of Special Areas and WaterNSW lands minimises the risks to water quality, ecological integrity and cultural heritage.</li> </ul>	<ul style="list-style-type: none"> <li>WaterNSW and the NPWS take an ongoing collaborative risk management approach in the Special Areas with an annual program focused on priorities including pests and weeds, assets and infrastructure, access, fire, ecology, cultural heritage, mining, and development.</li> </ul>

### Variations

- Higher than expected vegetation growth over the past 3 years and predicted dry conditions for the 18/19 fire season resulted in increased costs to manage vegetation growth on key fire breaks.
- Weed control across Wingecarribee Swamp was increased to take advantage of favourable weather conditions, increasing costs.
- An increase in deer control work was undertaken to support a co-operative tenure blind control program in the Illawarra area.

### 3. Water Quality Science

WaterNSW collects a wide range of scientific and spatial information to undertake risk assessments and investigations, increase understanding and insight about pollutants and their behaviour, improve monitoring and analysis, and prioritise actions to promote catchment water quality. WaterNSW works with the water industry, government agencies, research partners, and the community, to ensure that we use the best scientific evidence available.

#### 3.1 Evaluation Activities

Evaluation of WaterNSW programs and projects has an important role in improving the value and effectiveness of the work, and to advance the field of knowledge. WaterNSW uses different evaluative approaches that help to guide projects, suggest how they might be improved, and provide evidence to demonstrate whether they worked as intended.

Planned activities	Actual activities
<ul style="list-style-type: none"> <li>Evaluate the benefits of upgrading sewerage systems in Kangaroo Valley and Robertson.</li> <li>Review the macroinvertebrate monitoring program and analyse trends.</li> </ul>	<ul style="list-style-type: none"> <li>An additional three wet weather events were sampled to improve the assessment of benefits of Kangaroo Valley and Robertson sewerage system upgrades.</li> <li>Review of current macroinvertebrate monitoring program completed, including a power analysis of the ability to detect sub-catchment change.</li> </ul>

Planned outcomes	Actual outcomes
<ul style="list-style-type: none"> <li>Insight into the effectiveness of the program and benefits to water quality.</li> <li>Options for adapting the program design and improve detection of catchment impacts.</li> </ul>	<ul style="list-style-type: none"> <li>Projects in progress: a growing compilation of data is available for analysis.</li> <li>Options are being considered for the future of the macroinvertebrate program.</li> </ul>

### 3.2 Mining Research

The Sydney Catchment Area is entirely underlain by coal measures, with active mining limited to the Southern and Western coalfields including beneath the Metropolitan and Woronora Special Areas. The impacts of underground coal mining are complex and difficult to quantify. WaterNSW is working on improving methods for evaluating active and proposed mining leases.

Planned activities	Actual activities
<ul style="list-style-type: none"> <li>Establish a database of mining monitoring information to help assess cumulative impacts of operations.</li> </ul>	<ul style="list-style-type: none"> <li>Monitoring data (types, time steps, observation periods) received from Metropolitan Mine has been compiled.</li> <li>A preliminary concept of the mining water quality database (standalone freeware-based SQLite database) has been prepared.</li> </ul>

Planned outcomes	Actual outcomes
<ul style="list-style-type: none"> <li>Better evidence base for informing responses to mining development proposals.</li> </ul>	<ul style="list-style-type: none"> <li>Increased availability of data and evidence is supporting the development of more informed and transparent mining assessment.</li> </ul>

### 3.3 Risk Assessments

WaterNSW has an important role in managing the risk of waterborne pathogens such as *Cryptosporidium*. This requires cost effective and standardised monitoring and detection techniques that withstand scrutiny. WaterNSW works with Water Research Australia and other partners to stay up-to-date on techniques and methods to better characterise the risk and improve monitoring.

Planned activities	Actual activities
<ul style="list-style-type: none"> <li>Investigate the use of environmental tracers for detecting human faecal sources of pollution.</li> <li>Develop and refine monitoring techniques for microbial risk assessment.</li> </ul>	<ul style="list-style-type: none"> <li>Developing and refining techniques to improve standardised monitoring of faecal contamination indicators: a Taqman assay and DNA standards were developed for faecal source tracking via mRNA.</li> <li>Testing to help find better methods of routinely differentiating environmental E. coli from faecal E. coli including bioinformatic analysis, development and testing of multiplex PCR, identification of predictors, jar testing and disinfection experiments.</li> </ul>

Planned outcomes	Actual outcomes
<ul style="list-style-type: none"> <li>Improved information for catchment hazard assessment.</li> <li>Improved tools for assessing and characterising E. coli public health risk.</li> </ul>	<ul style="list-style-type: none"> <li>Projects in progress: positive, incremental steps are being made towards completion and fulfillment of outcomes.</li> </ul>

### Variations

Unbudgeted staff time spent reviewing the macroinvertebrate monitoring program.

## 4. Enforcement and Surveillance

WaterNSW has responsibilities under the Water NSW Act 2014, Protection of the Environment Operations Act 1997, and the Water NSW Regulation 2013 to protect water quality in the Sydney Catchment Area. WaterNSW works with its partners including the National Parks and Wildlife Service, NSW Fisheries, local councils, NSW Police and the community to satisfy these obligations.

The Special and Controlled Areas are areas of land that cover about 364,000 hectares of mostly unspoilt native bushland surrounding the water storages and infrastructure that supply Sydney, the Illawarra, Blue Mountains, Southern Highlands and Shoalhaven regions. Public access to the Special Areas is restricted under the WaterNSW Regulation 2013.

Regulatory activities include investigations, inspections, surveillance and patrols, and managing and monitoring access requests.

### 4.1 Surveillance Activities

WaterNSW has primary responsibility for managing public access to the Special Areas. These areas are restricted, and fines can apply for unauthorised access. WaterNSW provides clear signage and information about access, uses barriers and fencing, and surveillance activities to deter and identify illegal activities.

Surveillance activities are undertaken with the National Parks and Wildlife Service, Department of Primary Industries – Fisheries, and NSW Police.

Planned activities	Actual activities
<ul style="list-style-type: none"> <li>• Conduct at least three joint compliance operations with interagency partners.</li> <li>• Conduct 1,300 hours of Special Area surveillance.</li> </ul>	<ul style="list-style-type: none"> <li>• 3 joint agency surveillance operations with NSW Police, NPWS, DPI Fisheries and Local Councils.</li> <li>• 2,931 hours of Special Area surveillance.</li> <li>• Publication of the WaterNSW 'What you can and can't do' guide to the Special Areas.</li> </ul>

Planned outcomes	Actual outcomes
<ul style="list-style-type: none"> <li>Deter unauthorised access to Special and Controlled Areas.</li> </ul>	<ul style="list-style-type: none"> <li>An annual program of highly visible proactive and reactive approaches.</li> </ul>

## 4.2 Investigations

Investigations are a regulatory activity undertaken by WaterNSW to determine breaches of legislation including the Water NSW Act 2014, Protection of the Environment Operations Act 1997, and the Water NSW Regulation 2013. This activity helps deter illegal works that can impact on water quality and catchment infrastructure

Planned activities	Actual activities
<ul style="list-style-type: none"> <li>Investigate reports or discovery of illegal activity.</li> </ul>	<ul style="list-style-type: none"> <li>53 matters were identified for investigation.</li> <li>47 penalty infringement notices were issue.</li> <li>Investigations into two significant and potentially polluting water quality incidents.</li> <li>13 statutory notices issued, with two notices resulted in clean-up and prevention requirements, and the balance were directions to acquire more information about issues with the potential to impact water quality.</li> </ul>

Planned outcomes	Actual outcomes
<ul style="list-style-type: none"> <li>Deter activities inconsistent with water quality protection and the Protection of the Environment Operations Act.</li> </ul>	<ul style="list-style-type: none"> <li>An annual program of highly visible proactive and reactive approaches.</li> </ul>

### 4.3 Consent Applications

Entering the Special and Controlled Areas requires special consent. Only a small number of people or organisations each year are granted permission under strict conditions. WaterNSW will only grant consent to enter these lands for individuals, companies or groups who can show that their proposed activity meets several criteria. Entry can be granted for many reasons including research, cultural connection, management of utilities, photography, training or many other activities.

Planned activities	Actual activities
<ul style="list-style-type: none"> <li>Advise and educate potential applicants about policy on why and when we grant Special Area access consent and the application process.</li> <li>Assess, determine, and issue access consent applications with appropriate conditions.</li> </ul>	<ul style="list-style-type: none"> <li>Responding to public enquiries about catchment access and consent conditions.</li> <li>79 access consent applications were received, with 60 approved, 3 withdrawn, 1 refused, and 15 yet to be determined.</li> </ul>

Planned outcomes	Actual outcomes
<ul style="list-style-type: none"> <li>Special Areas are accessed consistent with conditions and regulations.</li> </ul>	<ul style="list-style-type: none"> <li>60 access consents issued with appropriate conditions consistent with the regulation.</li> <li>Access activities that have potential for significant impact are managed by imposing stronger conditions, or imposing a requirement for the nominated applicant/s to be escorted by WaterNSW.</li> </ul>

#### Variations

- Due to demanding investigations expenditure exceeded budget. Expert and legal advice was procured from external sources.
- Staff time was redirected from targeted inspections to the requirements of investigations of water pollution incidents.

## 5. Development Impact Assessment

Planning authorities receive and assess a range of development proposals in response to population growth, general intensification of land uses and for resource extraction and processing. It is important that this development does not result in further impacts on water quality.

State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011 and Planning Direction 5.2 Sydney Drinking Water Catchment are statutory instruments aimed at ensuring all new development has a neutral or beneficial effect on water quality. WaterNSW has a major role in the implementation of these instruments.

The process of assessing the impact of new development includes preparing guidelines, promoting current recommended practices, reviewing and providing advice on planning legislation and environmental planning instruments, and reviewing and providing advice on development applications. We work with the Department of Planning and Environment and local councils who have responsibilities under the Environmental Planning and Assessment Act 1979.

The risks presented by mining within the declared Sydney Catchment Area are an important focus for the WaterNSW. WaterNSW works with and provides advice to the Department of Planning and Environment, Independent Planning Commission, and the Department of Industry. The focus is to reduce risks associated with stored water, water supply infrastructure, and the environment.

### 5.1 Development Impact Assessment

Consent authorities (local councils, planning panels and the Minister for Planning and their delegates) cannot approve development unless satisfied the development would have a neutral or beneficial effect on water quality.

State Environmental Planning Policy (Sydney Drinking Water Catchment) 2011 states that all proposed development and activities should incorporate WaterNSW's current recommended practices. In July 2018 there are 33 practices addressing a range of land uses and phases including stormwater and wastewater management.

Planned activities	Actual activities
<ul style="list-style-type: none"> <li>Provide support to councils for development assessment tools and guidelines including the Neutral or Beneficial Effect Tool.</li> </ul>	<ul style="list-style-type: none"> <li>13 new NorBE Tool registrations and 24 tickets logged and completed.</li> <li>Advice issued to councils on high risk development applications including: 168 concurrence applications, 49</li> </ul>

- Provide advice to proponents, councils and determining authorities on all high risk and state significant developments and influence their decision to ensure WaterNSW's interests are protected.
- In coordination with Councils check compliance with concurrence conditions.
- Review current recommended practices including designing and installing on-site wastewater systems.

amended applications, 45  
modification applications, 46 88B  
Instruments, 27 other DA related  
matters.

- Advice issued to Dept. of Planning and Environment on 18 state significant developments including mining projects.
- 157 responses to proponents and councils on developments potentially impacting WaterNSW land, assets and infrastructure (146 for development proposals along the Upper Canal and Warragamba Pipelines).
- Compliance with concurrence conditions assessed for twelve DAs and final audit reports were sent to relevant councils.
- Review of Water Quality Information Requirements and the review of MUSIC User's guide underway.
- Expert technical input provided for the review of the NorBE Guide and Designing and Installing Onsite Wastewater Guide, and review of on-site current recommended practice.

#### Planned outcomes

- Developments and activities in the catchment continue to have a neutral or beneficial effect on water quality.

#### Actual outcomes

- New development and activities in the catchment continue to have a neutral or beneficial effect on water quality.

## 5.2 Land Use Planning

WaterNSW works with the Department of Planning and Environment and local councils with responsibilities under the Environmental Planning and Assessment Act 1979 to provide advice on guidelines, strategies, and environmental planning instruments. This guidance ensures that the legislation, plans, policies and frameworks guiding new developments have specific provisions to maintain and protect the Sydney Catchment Area.

Planned activities	Actual activities
<ul style="list-style-type: none"> <li>• Provide advice to local councils on rezoning proposals, planning proposals, local growth strategies, rural land strategies and Development Control Plans.</li> <li>• Provide advice to the Department of Planning and Environment on key changes to planning law, policies, planning instruments, regional growth plans and tools that affect the catchments and water infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>• 93 responses provided to local councils and the Department of Planning and Environment, including 22 planning proposals, and submissions for the concurrence and referrals review, review of the EP&amp;A Regulation, Environment SEPP, Greater Sydney Regional Plan, and Primary Production and Rural Development SEPP.</li> </ul>

Planned outcomes	Actual outcomes
<ul style="list-style-type: none"> <li>• All relevant strategic plans and policies contain provisions that help WaterNSW protect and manage water quality, catchment health and water supply infrastructure.</li> </ul>	<ul style="list-style-type: none"> <li>• All relevant strategic plans and policies contain provisions that support WaterNSW protecting and managing water quality, catchment health, and water supply infrastructure.</li> </ul>

## 5.3 Mining

WaterNSW has no legal powers to control mining in the Sydney Catchment Area, but as the partial owner and joint manager of the Special Areas we seek to influence the planning decisions and to hold mining companies to account for all impacts which significantly harm water quantity, water quality, and ecological integrity.

Mining is a significant community issue and an important focus for WaterNSW. WaterNSW provides advice to regulators, agencies, and the companies involved. We stay abreast of knowledge advances and conduct our own research into the impacts of mining.

Planned activities	Actual activities
<ul style="list-style-type: none"> <li>• Advocate WaterNSW principles for mining and coal seam gas impacts in all written advice, submissions and discussions about existing and proposed mining in the declared catchment and Controlled Areas.</li> <li>• Develop a risk-based assessment framework for evaluating future mining proposals, and incorporate this framework into future revisions of WaterNSW's Mining Principles and positions on mining in the declared catchment and Controlled Areas.</li> <li>• Provide input into relevant discussions with mining companies operating in the catchment through the agreed Governance Protocols.</li> </ul>	<ul style="list-style-type: none"> <li>• WaterNSW Mining Principles have been advocated in all suitable forums and written submissions.</li> <li>• A risk-based assessment framework has been developed and subjected to a rigorous program of consultation with government agencies, industry, and the community.</li> <li>• Regular Technical Working Group and Executive Steering Group meetings with the three mining companies operating in Special Areas (Governance protocols updated during this period).</li> </ul>

Planned outcomes	Actual outcomes
<ul style="list-style-type: none"> <li>• The WaterNSW principles for managing mining and coal seam gas impacts are considered in all decisions about mining activities and proposals in the catchment.</li> </ul>	<ul style="list-style-type: none"> <li>• WaterNSW advocacy led to restricted and/or more tightly conditioned approvals.</li> <li>• Our advocacy was partly responsible for the NSW Government's appointment of the Independent Expert Panel on mining in the Sydney Catchment Area Special Areas.</li> </ul>

## 6. Engaged Communities

More than 120,000 people live and work in the Sydney Catchment Area and tens of thousands of people travel through and visit the catchment daily. WaterNSW works and engages with residents and landholders, community organisations, schools, businesses, local councils, and government to support the long-term management of drinking water.

We use a range of communication tools including the visitor centre at Warragamba Dam, the WaterNSW website, publications and media articles, a community enquiry service and interpretation structures at our dams and recreation areas. We also deliver a school education program to primary and high schools from across the catchment and Sydney area, and professional development opportunities to teachers.

### 6.1 Community and School Education

The WaterNSW school excursion program offers primary and high school students the chance to explore all aspects of modern water supply, and to learn about water through hands-on activities in the Warragamba Dam Visitor Centre. The program is linked to the requirements of the NSW curriculum.

Planned activities	Actual activities
<ul style="list-style-type: none"> <li>• Deliver the Warragamba Dam school excursion program to around 3,500 students.</li> <li>• Deliver a professional development program for primary school teachers focused on water science.</li> <li>• Host approximately 100,000 visitors at the Warragamba Dam Visitor Centre.</li> <li>• Develop and evaluate temporary exhibitions at the Warragamba Dam Visitor Centre.</li> </ul>	<ul style="list-style-type: none"> <li>• 4,104 students were hosted in the Warragamba Dam school excursion program.</li> <li>• Delivery of a 1-day professional development course on water science.</li> <li>• Around 71,580 visitors were hosted at the Warragamba Dam Visitor Centre.</li> </ul>

Planned outcomes	Actual outcomes
<ul style="list-style-type: none"> <li>Surveyed participants have an increased knowledge and understanding of the role of WaterNSW, catchment management and risks to water quality and quantity.</li> </ul>	<ul style="list-style-type: none"> <li>Students within Primary, Geography, Senior Science, and Chemistry studies all showed an increase in knowledge and understanding of catchment management, water quality, and the role of WaterNSW in managing water quality impacts (based on evaluations completed by teachers on 3 occasions during 2017-18, 100% of students showed improved knowledge.</li> </ul>

## Financial Performance

### Operational Expenditure

Program / activity	Budget (\$'000)	Expenditure (\$'000)
<b>Source Water Protection</b>		
Grazing and Erosion Program	\$1,618	\$1,003
Urban Stormwater Program	\$664	\$405
Dairy Assistance Program	\$393	\$117
Remote Area Fire Management	\$1,255	\$1,238
<b>Total</b>	<b>\$3,930</b>	<b>\$2,763</b>
<b>Land Management</b>		
Fire Management	\$705	\$1,441
Unsealed Roads Program	\$225	\$250
Pests and Weeds Program	\$747	\$1,018
Barriers and Fencing Activities	\$586	\$280
Recreation Areas Management	\$1,800	\$1,964
Cultural Heritage	\$50	\$45
Reserve Management	\$4,460	\$3,535
<b>Total</b>	<b>\$8,573</b>	<b>\$8,533</b>
<b>Water Quality Science</b>		
Evaluation Activities	\$0	\$24
Mining Research	\$163	\$166
Risk Assessments	\$60	\$60
<b>Total</b>	<b>\$223</b>	<b>\$250</b>
<b>Enforcement and Surveillance</b>		
Targeted Inspections	\$112	\$3
Investigations	\$32	\$99
Consent Applications	\$166	\$150
<b>Total</b>	<b>\$310</b>	<b>\$252</b>
<b>Development Impact Assessment</b>		
Development Impact Assessment	\$641	\$745
Land Use Planning	\$188	\$211
Mining	\$580	\$662

<b>Total</b>	<b>\$1,409</b>	<b>\$1,618</b>
<b>Engaged Communities</b>		
Community Education	\$616	\$471
School Education	\$284	\$307
<b>Total</b>	<b>\$900</b>	<b>\$778</b>
<b>Grand Total</b>	<b>\$15,345</b>	<b>\$14,194</b>

### Capital Expenditure

<b>Project</b>	<b>Budget (\$'000)</b>	<b>Expenditure (\$'000)</b>
Bendeela Camping Ground Upgrade	\$105	\$39
Replacement of plant and equipment	\$700	\$16
Catchment infrastructure asset renewals	\$376	\$245
Fire trail upgrade	\$349	\$0
Special Areas and Braidwood land fencing	\$600	\$352
Burraborang demonstration raingarden	\$38	\$0
<b>Total</b>	<b>\$2,168</b>	<b>\$652</b>

## Appendix A. Catchment Audit Recommendations

Recommendations	Agency responsible	Status @ 30 June 2018
<b>Response to reduce mining risks and impacts in the Special Areas</b>		
Investigate thresholds at which mining activities cause loss of surface water to mine workings and impact the yield of individual Sydney catchment water supply systems. Results to be considered in the Metropolitan Water Plan.	WaterNSW and Metropolitan Water Directorate	On track: Project has been initiated to undertake a catchment water balance trial. On track for completion by December 2018. WaterNSW will also be liaising with the Independent Expert Panel for mining in the special areas.
<b>Response to reduce land degradation</b>		
Continue best practice land management programs, targeting 'high risk' properties in priority areas i.e. Wingecarribee, Braidwood, Wollondilly, Mulwaree, Upper Wollondilly and Nattai River sub-catchments.	WaterNSW and Local Land Services	On track: Limited additional data collected by new event samplers due to prevailing dry weather. Load calculations will be performed following next significant inflow event.
<b>Response to reduce bushfire risk</b>		
Update and implement bushfire risk management plans (BRMPs), considering 'cultural burn' practices and results of recent fire research.	Rural Fire Service and Councils	Complete: <ul style="list-style-type: none"> <li>• Post bushfire event monitoring is included in Part B of the current Water Monitoring Program.</li> <li>• There were no major fire events during the 2017/18 bushfire season that would warrant specific monitoring responses.</li> <li>• The need for this action will be revisited during and after the 2018/19 bushfire season.</li> </ul>
<b>Responses to improve data quality and monitoring</b>		
Integrate locations and timing for monitoring of macroinvertebrates, water quality and stream flow, including environmental flow monitoring sites.	WaterNSW	On track: Macroinvertebrate data review has been finalised. Workshop scheduled with subject matter experts to discuss findings and options.

Recommendations	Agency Responsible	Status @ 30 June 2018
<p>Improve information on water quality changes resulting from catchment improvement works. Summarise assessed improvements at each project site, and any qualitative or quantitative evidence at the sub-catchment scale. Conduct covariate statistical analysis of long-term water quality records at key monitoring stations.</p>	WaterNSW	<p>On track:</p> <p>Consultation with experts in modelling and economic analysis to determine an approach for this work.</p>
<p>Investigate feasibility and benefits of developing water quality guidelines for the Catchment by establishing suitable 'reference sites' which are in naturally vegetated sub-catchments in areas free of disturbance from human activity.</p>	WaterNSW	<p>On track:</p> <ul style="list-style-type: none"> <li>• Review of the locality specific benchmarks will commence once the revised ANZECC Guidelines have been published (estimated for release mid 2018)</li> <li>• The Operating Licence Reporting Manual requires us to report catchment water quality against ANZECC guidelines.</li> </ul>